In the claims

1.   (original)   A controller for a synchronous motor, the controller being operable in use to receive from sensor means coupled to a synchronous motor actual angular displacement signals representative of angular displacements from a reference orientation of a rotor of a synchronous motor, to transmit the actual angular displacement signals to a controllable alternating current (ac) supply for the motor, periodically to measure one or more parameters related to the torque of a synchronous motor, and between transmissions of the actual angular displacement signals, to derive from the actual angular displacement signals and measured parameters at least one estimated angular displacement signal representative of an estimated angular displacement from a reference orientation of a rotor of a synchronous motor, to enable the controller to cause to flow between the supply and a synchronous motor a generally sinusoidal current that is synchronised to the angular displacement of the rotor from the reference orientation.

2.   (original)   A controller according to claim 1, which is operable periodically to measure one or more parameters related to a torque of a synchronous motor, which parameters include a voltage across, or a current flowing in, a winding of the motor.

3.   (currently amended)   A controller according to claim 1 ~~or claim 2~~, which is operable periodically to measure one or more parameters related to a torque of a synchronous motor, which parameters include a characteristic of a load coupled to the motor.

4.   (currently amended) A controller according to ~~any preceding~~ claim 1, which is operable to store a mathematical model of a synchronous motor, and to derive the at least one estimated angular displacement signal by inserting the measured parameters into the mathematical model.

5.   (currently amended)   A controller according to ~~any preceding~~ claim 1, which is operable periodically to receive a first signal proportional to a voltage applied across a winding of a synchronous motor, and a second signal proportional to a current flowing between the supply and the motor, said first and second signals constituting said parameters.

6.   (currently amended)   A controller according to ~~any preceding~~ claim 1, which is operable, upon receiving an actual angular displacement signal, to subtract an estimated angular displacement signal from the actual angular displacement signal, to generate an angular displacement error signal and to adjust the mathematical model so as to reduce the magnitudes of subsequent angular displacement error signals.

7.   (currently amended)   A controller according to ~~any preceding~~ claim 1, which is operable periodically to derive from the actual angular displacement signals and measured parameters an estimated angular velocity signal representative of an estimated angular velocity of the rotor, and to transmit the estimated angular velocity signal to an angular velocity governor.

8.   (currently amended)   A synchronous motor drive comprising a controller in accordance with ~~any of claims 1 to 7~~ claim 1, a synchronous motor, a controllable alternating current (ac) supply, and sensor means coupled to a rotor of the motor and operable periodically to transmit to the controller an actual angular displacement signal representative of an angular displacement from a reference orientation of the rotor, the controllable ac supply being operable to receive actual and estimated angular displacement signals from the controller and, in response to the angular displacement signals, to supply to each winding of the motor a generally sinusoidal current that is synchronised to the angular displacement of the rotor from the reference orientation.

9.   (original)   A synchronous motor drive according to claim 8, wherein the controllable ac supply is a PWM inverter.

10.   (original)   A synchronous motor drive according to claim 9, wherein the PWM inverter is a three-phase inverter and the synchronous motor is a three-phase synchronous motor.

11.   (currently amended)   A synchronous motor drive according to ~~any of claims 8 to 10~~ claim 8, wherein the synchronous motor is a permanent-magnet synchronous motor.

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12.   (currently amended) A synchronous motor drive according to ~~any of claims 8 to 11~~ claim 8, wherein the sensor means comprises a plurality of Hall effect sensors.

13.   (original)   A synchronous motor drive according to claim 12, wherein the sensor means comprises three Hall effect sensors, which are so arranged relative to the motor as to generate an actual angular displacement signal for each 60° of angular displacement of the rotor from the reference orientation.

14.   (currently amended) A synchronous motor drive according to ~~any of claims 8 to 13~~ claim 8, wherein the controller is operable to measure the one or more parameters related to the speed of the motor and to transmit an actual or estimated angular displacement signal to the controllable ac supply at intervals that are much less than a response time of the motor.

15.   (currently amended) A synchronous motor drive according to ~~any of claims 8 to 14~~ claim 8 when dependent from claim 7, which further comprises a governor operable to receive estimated angular velocity signals from the controller, to subtract the estimated angular velocity signals from a demanded angular velocity signal representative of a demanded angular velocity of the rotor set by a user of the drive, so as to generate an angular velocity error signal, and to cause the controllable ac supply to increase or decrease the amplitude of the generally sinusoidal current so as to reduce the magnitudes of the angular velocity error signals.

16.   (original)   A method of controlling a synchronous motor, comprising the steps of receiving from sensor means coupled to a synchronous motor an actual angular displacement signal representative of an angular displacement from a reference orientation of a rotor of the motor, transmitting the actual angular displacement signal to a controllable alternating current (ac) supply, measuring one or more parameters related to an angular acceleration of the rotor, deriving, using a mathematical model of the motor, from the actual displacement signal and the one or more parameters an estimated angular displacement signal representative of an estimated angular displacement of the rotor, transmitting the estimated angular displacement signal to the controllable ac supply, and thereby causing to flow between the controllable ac supply and the motor a generally sinusoidal current that is synchronised to the angular displacement of the rotor.

17. (original)   A method according to claim 16, which further comprises the step of measuring the one or more parameters related to an angular acceleration of the rotor, deriving, using the mathematical model, from the estimated angular displacement and the one or more parameters a further estimated angular displacement signal representative of an estimated angular displacement of the rotor, and transmitting the further estimated angular displacement signal to the controllable ac supply.

18. (original)   A method according to claim 17, which further comprises the step, upon receipt of an actual angular displacement signal, of comparing the actual angular displacement signal with a further estimated angular displacement signal to generate an angular displacement error signal, and adjusting the mathematical model so as to reduce the magnitude of subsequent angular displacement signals.